

### REMARKS

The specification, drawings and claims have been amended to improve the style of this application. Applicant thanks the Examiner for the careful reading of this application, and for pointing out discrepancies.

In particular Fig. 6 has been amended to substitute reference 4 for reference 3, and to substitute reference 3 for reference 4. Fig. 6 now better corresponds to the first full paragraph on page 6. The first full paragraph on page 6, has also been amended to describe the connection and interaction of the intermeshing gearwheels 16, 17, 18 with the first part 3 and the second part 4. New Figs. 10 - 13 have also been added to show the features in original claims 17 and 18.

The Office Action indicates that line 3 of claim 1 is unclear as to the recitation of “a movement of one part is removable on its side”. Applicant notes that the concept of a movement of one part being removable is similar to the concept of a “power takeoff”. Because this application was originally filed in a Foreign Country in a Foreign language, this concept has been translated literally from the Foreign words. In essence, the one part is made accessible or connectable so that the movement of the one part can move other parts. In Fig. 6, the one part is reference 3 with a side 3b that can be connected to other parts such as gears or shafts so that element 3 may move those gears or shafts. The limitation or feature which claim 1 line 3 sets forth, is that the one part, such as part 3, cannot be completely enclosed so that it cannot be connected or accessible to turn another part. New claim 26 also sets forth this feature using slightly different wording. If the Examiner has any comments or suggestions for alternate

wording of this feature in either of claims 1 or 26, the Examiner is invited to contact Applicant's representative by telephone to discuss possible changes.

The original claims have been rejected as being either anticipated by Eberle or obvious over Eberle in view of Iwata.

With this Amendment Applicant has added new claim 25 which sets forth a gear arrangement comprising a first part, where the first part has first and second diametrically opposite sides. In the embodiment of Fig. 6, the first part is represented by reference 4 in the amended Fig. 6. The first side is the top side of reference 4, and the second side is the bottom side of reference 4. Claim 25 sets forth a drive shaft which is represented in the embodiment of Fig. 6 by reference 7. The second part and the reference shaft of claim 25 are shown in the embodiment of corrected Fig. 6 by reference numbers 3 and 15 respectively.

When the motor 6 turns the drive shaft 7, the gears 16, 17 and 18 rotate about their respective axis. This causes the second part 3 to rotate about the axis 2. The reference shaft 15 is fixed to the first part 4 and extends through the second part 3. From the drawings, it is seen that second part 3 rotates with respect to reference shaft 15. It is also shown in Fig. 6, the bottom or power takeoff side of second part 3 can be connectable, and is accessible, to additional parts in order to transfer power or movement. The specific relationship between the second part 3 and the reference shaft 15 is an important feature of the present invention. In particular it is desirable to put a position sensor, such as element 10 in Figs. 7 - 9 on the power takeoff side. It is desirable to connect one end of the position sensor to the second part 3, and the other end to the reference shaft 15. In this way the exact position of the second part 3 with

respect to the first part 4 can be accurately and easily determined. If the position sensor is arranged in the center of the second part 3, the outer portions of the second part 3 can be connected to other structure which needs to be moved or powered.

Applicant has reviewed the reference of Eberle. Applicant finds no teaching nor suggestion in Eberle of any reference shaft fixed to a first part and extending through a second part to a power takeoff side of a second part. This is especially true with regard to a second part that is operatively connected to a drive shaft. Applicant notes that if element 105 of Eberle is equated with the second part of the present invention, element 105 is not operatively connected to a drive shaft, and especially not to element 103 of Eberle. Claim 25 therefore sets forth structure, and relationship between structure, which is not taught nor suggested by Eberle. Claim 25 therefore defines over Eberle.

Claim 26 sets forth that the power takeoff side of the second part is accessible and connectable to an additional part to move the additional part due to rotation of the second part. As Applicant has described previously, in the embodiment of Fig. 6, the power takeoff side is the bottom of reference 3. This side can be connected to other parts so that rotation of the drive shaft 7 indirectly moves those other parts through the second part 3. Applicant's review of Eberle, finds no teaching nor suggestion of element 105 having a power takeoff side which is accessible to additional parts to move the additional parts. Claim 26 therefore further defines over the prior art.

Claim 27 sets forth a first robot arm connected to the first part, and a second robot arm connected to the second part. The present specification clearly states that the present invention

relates to a gear, particularly for a robot. Applicant has found the particular gear arrangement of claim 27 to be particularly useful when the first part is connected to a first robot arm, and the second part is connected to a second robot arm. Applicant finds no teaching nor suggestion in the prior art of the gear arrangement of 27 connected to robot arms, and therefore claim 27 further defines over the prior art.

With its independent claims 1 and 24, the present invention relates to a gear for a robot with the specific features of claim 1 and to a robot incorporating such type of gear, respectively.

A gear is a passive device transforming an incoming - rotational - movement to a different - with reference to speed and/or direction - outgoing rotational movement. A gear is not a drive. A gear does not incorporate a motor.

Accordingly cited document Eberle et al. discloses a drive having a gear and a motor. The latter has a driven shaft (output pinion 103). The driven shaft 103 of the motor 101 meshes with a toothed wheel 104. The toothed wheel 104 is (arranged) in a housing 105 fixedly mounted with the motor housing. The movement of the toothed wheel 104 may be tapped at the shoulder 115 of mounting flange 106 fixed to said toothed wheel 104.

As "gear" is realized by the pinion of the motor fixedly joint to the latter and the toothed wheel 104. Said "gear" would no longer exist if the motor is separated from the housing 105. Contrarily to this, the subject matter of the invention is a gear as such including a drive shaft which includes that the latter is held in a being of the gear and accordingly combined with the other parts of the gear, which is not the case with the device of Eberle et al. This is a first difference between Eberle and subject matter of the invention.

Furtheron, Eberle et al fails to disclose the feature of amended claim 1, according to which said movement of said one part is additionally removable by means of said shaft on a second end side facing said other part.

Eberle et al. does not disclose additionally removing / tapping off / taking off a movement of one of the rotatory parts on its second end side facing the other part by means of said shaft (and remote from the first and side of the first part). In Eberle et al the movement of 'the drive can only be tapped/removed at shoulder 115. The part 106 which the rejection refer to as a "shaft" merely serves for transfer of movement of toothed wheel 104 to fixedly attached shoulder 115, which is not rotatable relative to said one part 104 but fixed by mounting flange 106. In the applied prior art, movement only is removable / tapped / taken off on one side, the end side remote from the motor, and on no other end side of the device.

Amended claim 1 must therefore be considered not only novel with respect to cited document Eberle et al but also not, obvious.

Claims 18 and 24/18 are rejected as being obvious over Eberle et al. in view of Iwata (US 4,840,090). Pending claim 18 is depended from claim 1 and relates to a robot gear according to pending claim 1 as discussed above with the addition of said gear being a harmonic drive gear.


Harmonic drive gears are known as such, which is the teaching of cited document US 4,840,090: Said document discloses a harmonic speed changer arranged in an articulation between first and second robot arms. However, even in combination with above-mentioned US 4,589,816, said document does not show a shaft devised for additionally removing a rotary

movement of one gear part on its second end side facing the other gear part as claimed by the invention. Furtheron, Iwata does not incite a person skilled in the art to provide such a shaft for additional movement/ removal as it is dedicated entirely to the arrangement of a harmonic speed changer as such. An embodiment such as claimed in the application must rather be considered non-obvious over the cited combination and pending claims 1 and 24 (alongside the dependent claims) patentable over the cited prior art.

If the Examiner has any comments or suggestions which would further favorable prosecution of this application, the Examiner is invited to contact Applicant's representative by telephone to discuss possible changes.

At this time Applicant respectfully requests reconsideration of this application, and based on the above amendments and remarks, respectfully solicits allowance of this application.

Respectfully submitted  
for Applicant,

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Enclosed:    Marked-Up Paragraphs from the Specification  
                 Marked-Up Version of Claim 1  
                 Letter Re Drawing Corrections

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## MARKED-UP PARAGRAPHS FROM THE SPECIFICATION

Page 6, paragraph starting at line 12 and ending at line 23:

The gear shaft 3 is mounted by means of antifriction bearings, e.g. ball bearings 5 in the gearbox 4. In order to remove the movement of the gearbox 4 with respect to the gear shaft 3 on the side 3b of said shaft 3 remote from the gearbox 4, the latter has a shaft 15, which traverses the gear shaft 3 and is connected in non-rotary manner to the gearbox 4. For transmitting the torque of the in particular high speed side drive shaft 7 is provided a gearwheel 16 located thereon and which meshes with a gearwheel 17 mounted in rotary manner on the gearbox 4, which in turn is in engagement with a gearwheel 18 connected in non-rotary manner to the gear shaft 3. Planet wheel 18 further on meshes with an internal gear 19 formed on the interior wall of the gearbox 4. The gearwheels 16, 17, 18 make it possible to increase the torque of the drive motor 6 and bridge the eccentric arrangement of its drive shaft 7 with respect to the gear axis 2.

## MARKED-UP VERSION OF CLAIM 1

1. (Amended) Gear ~~(1)~~, particularly for a robot; having a drive shaft ~~(7)~~ and at least two first and second parts (3, 4) rotatable relative to the ~~latter~~drive shaft and to one another, in which a movement of ~~one~~the first part (3, 4) is removable on ~~its~~a first end side (3b, 4b) remote from the ~~other~~second part (4, 3), characterized in that at least one of the ~~rotary parts (3)~~ has a reference shaft (15) connected in non-rotary manner thereto and which projects at least to the other part ~~(4, 3)~~said movement of said first part is additionally removable by means of said shaft on a second side facing said second part and remote from said first end side.